

# Washington Transportation Plan Update

## *Phase 2 Workshop*

Demand – Capacity Imbalance

Bottlenecks and Chokepoints

**Douglas B. MacDonald**  
Secretary

**Paula Hammond**  
Chief of Staff

**Elizabeth Robbins**  
Manager  
Policy Development and Regional Coordination  
and

**WSDOT Program Managers**

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**Washington State  
Department of Transportation**

# **Bottlenecks and Chokepoints**

What near-term investment opportunities will help to move people and goods more quickly, efficiently and reliably?

# Bottlenecks and Chokepoints

## Guiding Principles (Statutory and Commission Policy) for Bottlenecks and Chokepoints

"The legislature intends that funding for transportation mobility improvements be allocated to the worst traffic chokepoints in the state. Furthermore, the legislature intends to fund projects that provide systemic relief throughout a transportation corridor, rather than spot improvements that fail to improve overall mobility within a corridor." **(RCW 47.05)**

Relieve Congestion. Provide mobility for people and goods. **(RCW 47.05.010)**

It is the intent of the legislature that investment of state transportation funds to address deficiencies on the state highway system be based on a policy of priority programming having as its basis the rational selection of projects and services according to factual need and an evaluation of life cycle costs and benefits that are systematically scheduled to carry out defined objectives within available revenue. **(RCW 47.05.010)**

Improvement program to address congestion and increase mobility. **(RCW 47.05.030)**

Priority programming for the improvement program must be based primarily upon or consider congestion, delay, accidents, the cost effective movement of people and goods. **(RCW 47.05.051)**

### Commission:

Promote land use management, telecommunications and other innovative technologies as viable mobility options to reduce the impact of congestion on all system users.

Support limited strategic expansion to accommodate growth and reduce congestion when possible.

Use cost-benefit methodologies as key determinants in selecting mobility projects.

Develop good connections across interstate and international borders.

## What might this mean?

- Bottlenecks and chokepoints present constraints on the potential capacity of transportation corridors and systems. These constraints can be often effectively relieved by spot investments that enhance capacity along and through an entire corridor.
- In general, when investment capacity is constrained, spot investments to ease bottlenecks and chokepoints will generally yield more cost-effective solutions than corridor-length capacity expansions.
- Bottleneck and chokepoint investments should be questioned, however, when their effect will simply be to relocate congestion to the next pinch-point in a system.
- The rationale for bottleneck and chokepoint investment is applicable to many types of transportation system, not just highways. The applicability to freight systems in general and rail and other commodity transportation systems (barges, pipelines) should be an important transportation investment consideration.
- In the State of Washington there are a number of prominent and costly transportation bottlenecks that merit close attention for corrective investment. These include:
  - o I-405 from Tukwila to Bothell
  - o I-5 through Downtown Seattle
  - o I-5 Columbia River Bridge in Vancouver
  - o SR 520 Evergreen Point Floating Bridge across Lake Washington
  - o I-90 in Spokane

Bottlenecks and Chokepoints	
"To Do" Policy	<b>Ferries</b> Define policy for Washington State Ferries service options (Underway)
"To Do" Strategy	<b>Ferries</b> Define a strategy to implement service options (Underway) <b>Rail</b> Develop a mainline rail capacity strategy (Underway)
Proposed Areas of Targeted Investment	<b>Ferries</b> Washington State Ferries capital <b>Highways</b> Bottleneck and chokepoint capital investment program Targeted Capital Investments Corridor Completion Corridor Expansion

# Bottlenecks and Chokepoints

## Washington State Ferries Service Policy and Strategy

### What is the Problem?

Future demand for ferry service will be significant and require some system re-configuration. A policy and implementation strategy are needed to direct implementation of the program.

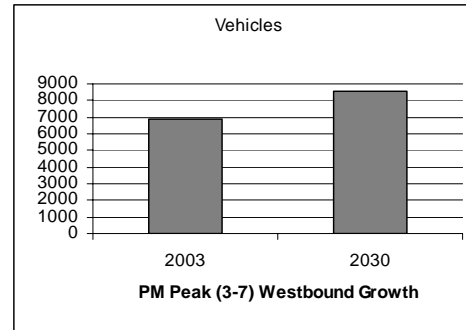
### Description of Proposal

Several service options are possible to add service, re-route existing service, increase existing capacity and add new capacity at specific locations.

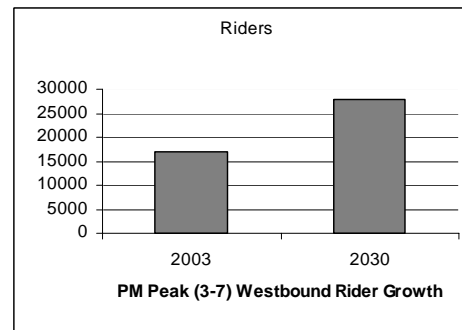
Examples:

- Rerouting some South Sound traffic to Seattle downtown
- Expand capacity on Kitsap routes such as Bremerton, or Edmonds, or Bainbridge; *or* some combination
- Additional capacity at Whidbey and Mukilteo/Canton
- San Juan Islands capacity to mainland vs. inter-island sailing frequency, *or* major terminal investments
- Take Legislative direction on state's in-passenger service

Travel Forecast: 2003 to 2030



**23% Growth in Vehicles**



**64% Growth in Total Riders**

#### Type of Proposal

- ☒ Policy
- ☒ Strategy
- ☒ Capital
- ☐ Operating

#### Expected Benefits

- ☐ Preservation
- ☐ Safety
- ☐ Transportation Access
- ☐ System Efficiencies
- ☐ Future Visions
- ☒ Bottlenecks and Chokepoints
- ☐ Moving Freight
- ☐ Economy
- ☐ Health and Environment

All or Part Included in '05 – '07 Commission

Funding Recommendation?  
☐ All ☒ Part ☐ None

Funded in Current Law Budget

☐ All ☒ Part ☐ None

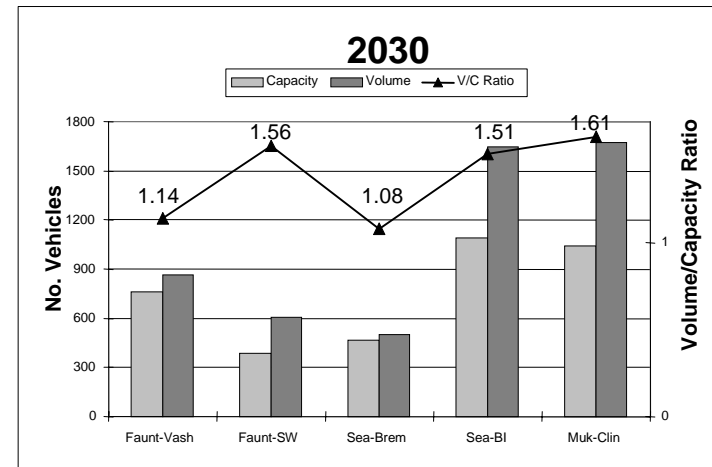
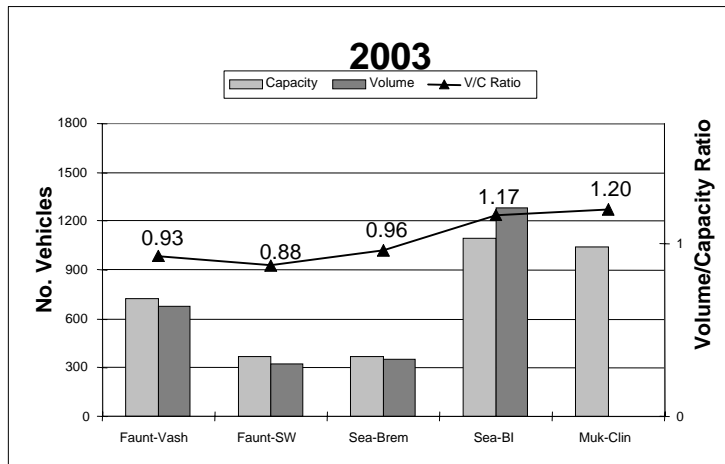
# Bottlenecks and Chokepoints

## Washington State Ferries Service Options Program

### Description of Benefits/Impacts of Implementing the Proposal

- Assist in reducing congested routes and chokepoints.
- Provide a better fit between the amount and type of ferry service to each terminal's logistical capacity. (Fauntleroy terminal constraints)
- Achieving a better balance of ferry service demand and the available supply on the Kitsap Peninsula.
- Increase WSDOT's ability to adjust to future growth for pedestrians, cyclists, vehicles, and freight movement

### Volume-to-Capacity Ratios on Congested Routes (Average Weekday, 3-7 PM, Westbound)



# Bottlenecks and Chokepoints

## Develop a mainline rail capacity strategy

### What is the Problem?

Container freight entering the Ports of Seattle and Tacoma is projected to triple by 2025 and passenger rail is projected to increase during the same time period. However, the east-west rail capacity will not handle the tripling of current rail volume on the mainline.

### Description of Proposal

Review the relationship between freight and passenger rail service and identify the locations of bottlenecks and chokepoints for mainline rail on the I-5 and the east-west rail corridors.

WSDOT would convene a group of mainline rail interested parties to recommend a strategy for alleviating mainline rail capacity constraints and identify the department's role in resolving the capacity constraints.

### Description of Benefits/Impacts of Implementing the Proposal

Most container freight entering the two Westcoast ports is shipped to the Midwest by way of rail. It is in the state's economic interest that Washington commodities and commodities shipped through Washington get to market efficiently.

Type of Proposal	
<input type="checkbox"/>	Policy
<input checked="" type="checkbox"/>	Strategy
<input type="checkbox"/>	Capital
<input type="checkbox"/>	Operating
Expected Benefits	
<input type="checkbox"/>	Preservation
<input type="checkbox"/>	Safety
<input type="checkbox"/>	Transportation Access
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<input type="checkbox"/>	Future Visions
<input type="checkbox"/>	Bottlenecks and Chokepoints
<input checked="" type="checkbox"/>	Moving Freight
<input type="checkbox"/>	Economy
<input type="checkbox"/>	Health and Environment
All or Part Included in '05 – '07 Commission Funding Recommendation?	
<input type="checkbox"/> All	<input type="checkbox"/> Part <input checked="" type="checkbox"/> None
Funded in Current Law Budget	
<input type="checkbox"/> All	<input type="checkbox"/> Part <input checked="" type="checkbox"/> None

# Bottlenecks and Chokepoints

**Bottlenecks:** places where roadways physically narrow, causing congestion (examples: lane drops; narrowing shoulders)



**Chokepoints:** places where delay occurs because of traffic interference and/or the roadway configuration (examples: freeway interchanges; lack of left turn lanes at intersections; seasonal road closures)





# Bottlenecks and Chokepoints

## Highways

### What is the Problem?

The demands placed on transportation systems have far outpaced investments in capacity expansion for many years. The result of this continued demand/investment imbalance is a demand/capacity imbalance. These imbalances have led to ever increasing delay which has affected the economy and public safety. Traffic congestion and all its negative effects are now an everyday condition, especially on arterials and freeways in major urban areas.

Traffic congestion is expensive. WSDOT calculates the annual social cost to be about \$1.6 billion per year in terms of both lost productivity and goods delayed.

### Description of Proposal

Develop a program to provide targeted investments in smaller scale projects that reduce travel times for highway users and regain the lost productivity of the system.

Develop approaches to build out corridors incrementally using both operational and smaller scale capital investments. Potential solutions can be designed to be the first phase or increment of many corridor improvements.

In consultation with regional planning organizations, WSDOT has developed a draft list of bottleneck and chokepoint locations.

### Description of Benefits/Impacts of Implementing the Proposal

Targeting capital and operational investments at bottlenecks and chokepoints is less expensive than full corridor projects and can result in a recognizable reduction in delay and improved flow for system users. Projects that reduce delay can also reduce the probability of collisions, which in turn further reduces the potential for congestion occurring. In addition, these projects can also address preservation needs by replacing or retrofitting deteriorated pavements, structures, and other highway assets.

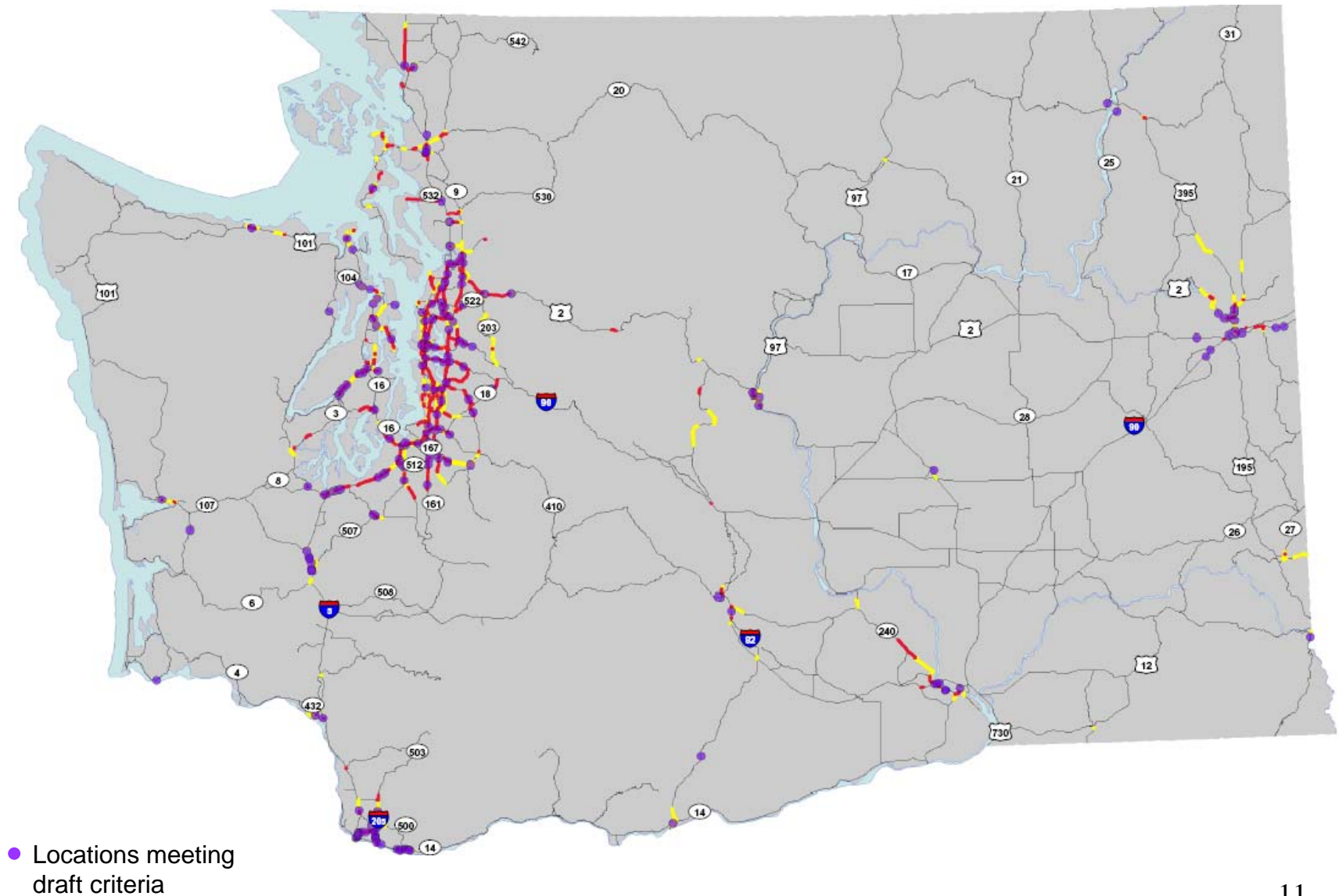
Type of Proposal	
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<input type="checkbox"/> All	<input checked="" type="checkbox"/> Part <input type="checkbox"/> None
Funded in Current Law Budget	
<input type="checkbox"/> All	<input checked="" type="checkbox"/> Part <input type="checkbox"/> None

# Draft Bottleneck/Chokepoint Criteria:

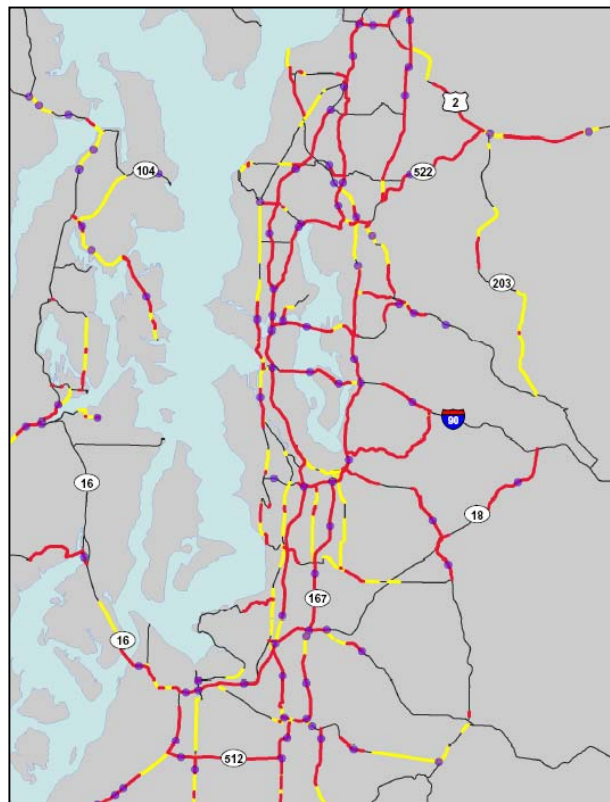
In order for a location to be considered a Bottleneck/Chokepoint it must satisfy the definitions and at least one of the following applicable criteria:

1. The congestion is a problem today or anticipated for 10 – 20 years out.
  - Observed congestion must be supported with traffic data and analysis models.
2. The congestion problem impacts the flow of mainline through traffic.
  - Measurable impact on mainline traffic flow is defined as through vehicle peak hour speeds that are determined (measured or modeled) to be equal to or less than 70 percent of the posted speed.
  - Mainline traffic flow criteria for ramps will be applied to the mainline through lanes as defined by the Highway Capacity Manual ramp influence area.
3. The congestion is caused by on/off ramp traffic.

# Current Statewide Conditions with Identified Bottlenecks/Chokepoints

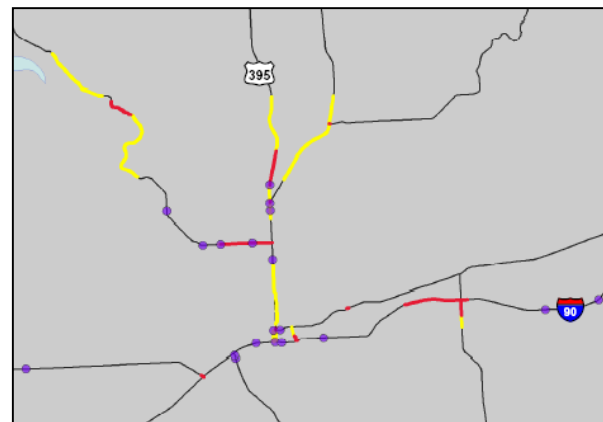


# Current Urban Conditions with Identified Bottlenecks/Chokepoints

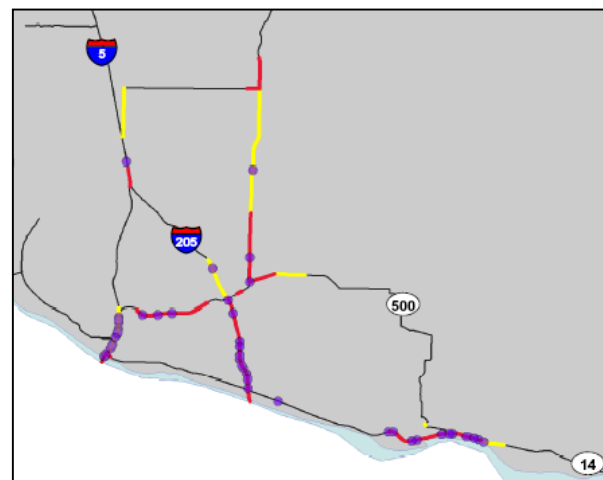


Puget Sound

- Locations meeting draft criteria



Spokane



Vancouver

# Bottlenecks and Chokepoints

## Example Location and Solutions:

US 2/I-5 to SR 204

### What is the Problem at this location?

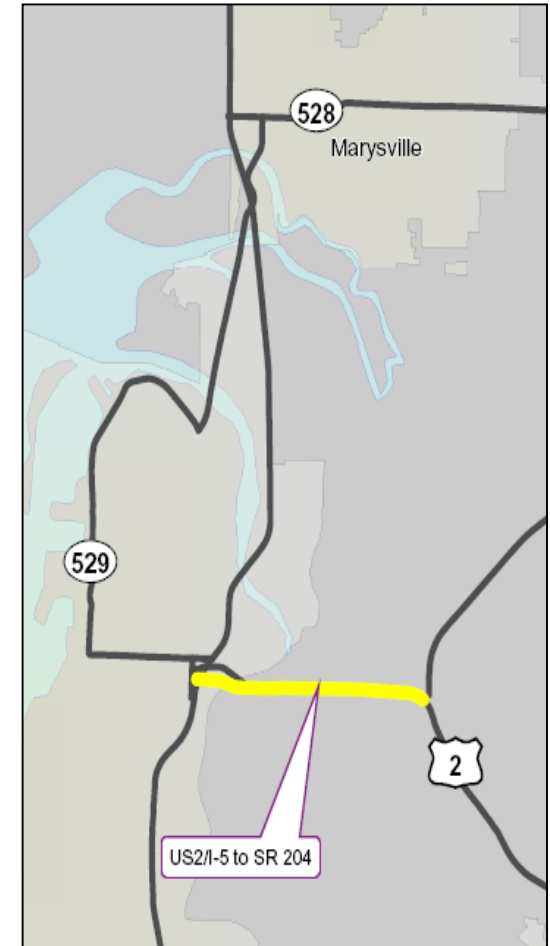
US 2 provides the primary link between residential and major employment areas in Snohomish County. Rapid residential growth in Snohomish County east of the Snohomish River has resulted in daily congestion on US 2.

### Description of Possible Solution

Widen eastbound US 2 to three lanes between the Snohomish River and SR 204. The I-5 interchange and the SR 204 interchange will also be modified to match the new configuration.

### Description of Benefits/Impacts of Implementing the Proposal

- Speeds are anticipated to increase from 46 mph to 58 mph
- Delay is anticipated to decrease from 288 hours to 125 hours
- Total injuries are anticipated to decrease from 24 to 7



# Bottlenecks and Chokepoints

## Example Location and Solutions:

### SR 9 and Lundeen Parkway Intersection

#### What is the Problem at this location?

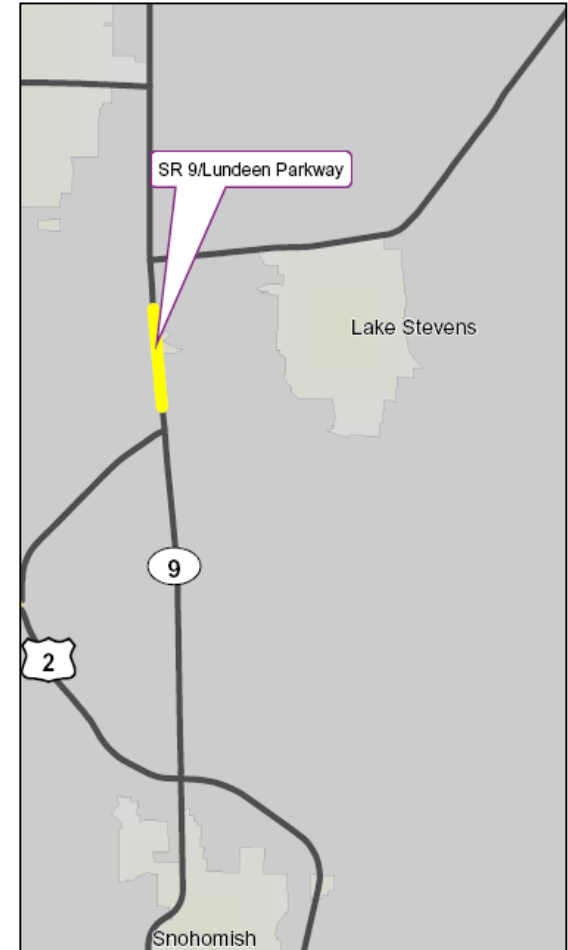
Lundeen Parkway is one of the primary east-west routes providing access to and from the City of Lake Stevens and SR 9. Traffic volumes at the intersection of SR 9 and Lundeen Parkway are continuing to grow resulting in increased delay to traffic on SR 9.

#### Description of Possible Solution

Construct a westbound left-turn lane on Lundeen Parkway and revise signal operations to reduce the amount of green-time required to serve the Lundeen Parkway turning and through movements.

#### Description of Benefits/Impacts of Implementing the Proposal

- Speeds are anticipated to increase from 38 mph to 43 mph
- Delay is anticipated to decrease from 337 hours to 176 hours
- Total injuries are anticipated to decrease from 9 to 3



# Bottlenecks and Chokepoints

## Example Location and Solutions:

SR 167/84<sup>th</sup> Ave. S. to S. 180<sup>th</sup> Street

### What is the Problem at this location?

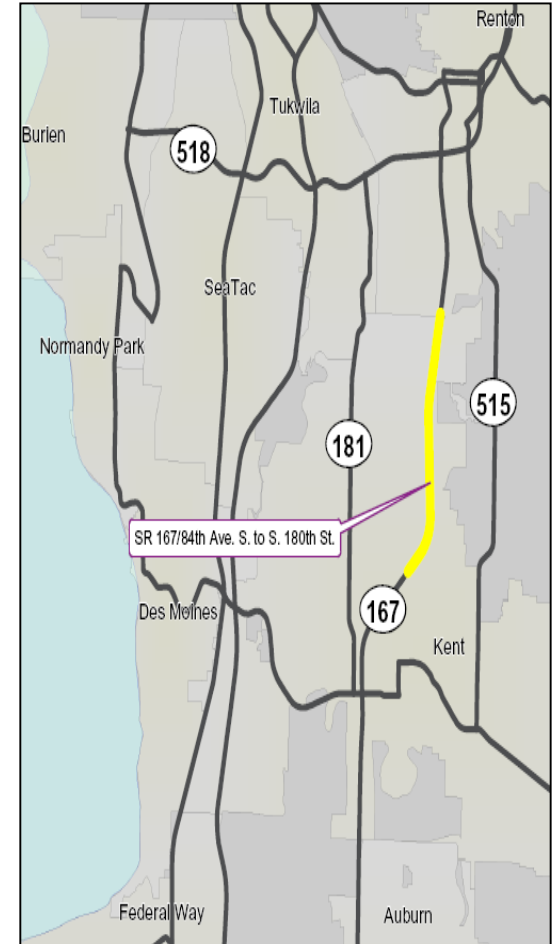
With the primary job base in the Seattle/Bellevue/Renton urban areas and rapid residential growth in south-east King County and north-east Pierce County, SR 167 is one of the most congested highways in Washington State on a daily basis.

### Description of Possible Solution

Add one auxiliary lane to SR 167 in each direction between the 84<sup>th</sup> Ave. S. Interchange and the S. 180<sup>th</sup> Street Interchange.

### Description of Benefits/Impacts of Implementing the Proposal

- Speeds are anticipated to increase from 39 mph to 56 mph
- Delay is anticipated to decrease from 1,882 hours to 223 hours
- Total injuries are anticipated to decrease from 39 to 12





# Bottlenecks and Chokepoints

## Example Location and Solutions:

### I-182/SR 240 to George Washington Way

#### What is the Problem at this location?

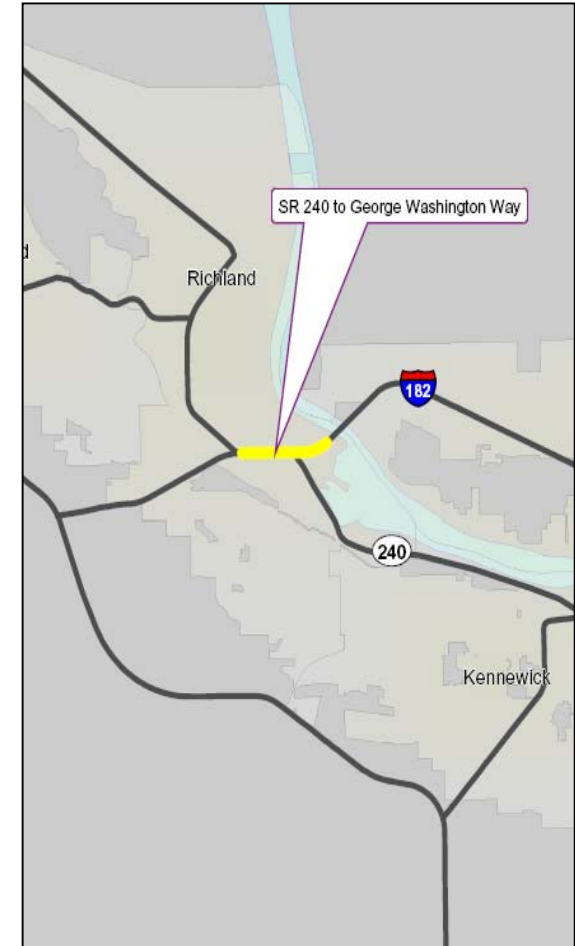
A short weaving distance exists between two closely spaced interchanges. This weave consists of two on-ramp lanes adding to two highway lanes which is then followed by two lanes exiting at the next interchange - requiring that the highway reduce from four lanes back down to two. With increasing traffic volumes, this section of highway no longer functions efficiently resulting in delay and accidents.

#### Description of Possible Solution

Add one lane in each direction to reduce conflicts between through traffic and traffic entering and existing the highway at these interchanges.

#### Description of Benefits/Impacts of Implementing the Proposal

- Speeds are anticipated to increase from 40 mph to 48 mph
- Delay is anticipated to decrease from 277 hours to 152 hours
- Total injuries are anticipated to decrease from 5 to 2





# Next Steps

- Perform further analysis of existing conditions
- Solution development and cost estimating
- Estimation of benefits and impacts
- Continue coordination with RTPO's
- Develop methodology for Commission prioritization of bottleneck and chokepoint investments

## Corridor Completion and Expansions are also required

There are a number of corridors where work has started (design, right of way and construction) that are incomplete.

These include:

SR 509 South from SeaTac

SR 167 from Puyallup to Tacoma

US 395 The North Spokane Corridor

Many corridors are currently inefficient because of high demand, other corridors are currently operating near maximum efficiency but will become inefficient in the future.

Examples of inefficient corridors include:

SR 522 from Bothell to Monroe

I-205 in Vancouver

SR 532 From I-5 to Camano Island

Examples of corridors that will become inefficient in the future include:

I-5 South of Olympia

I-90 At Snoqualmie Pass

I-90 East of Spokane

SR 509 Sea-Tac Airport To I-5

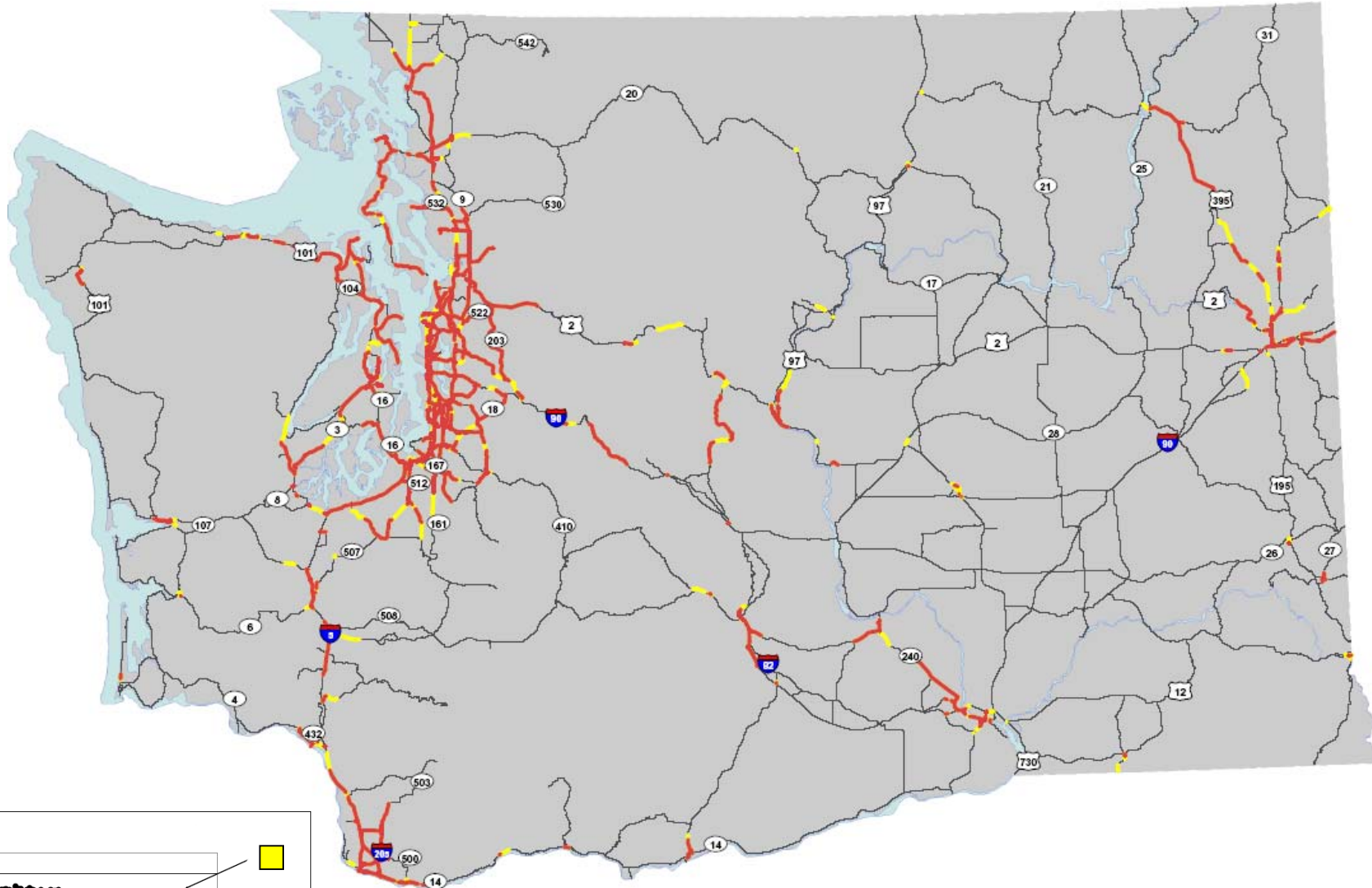
SR 167 Tacoma To Puyallup

SR 704 Cross Base Highway

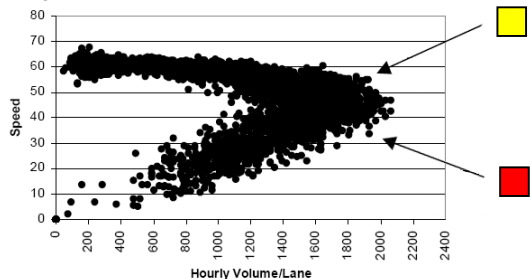
SR 510 Yelm Bypass

US 395 North - South Spokane Corridor

# Corridors Needing Expansion



Legend:



Under what conditions should general capacity expansion be made to corridors?